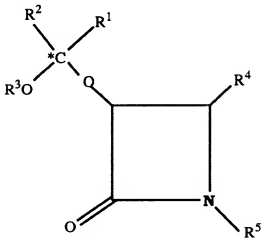
What is claimed is:

1. A β-lactam of the following formula I:



(I)

where

R^1 and R^2 are:

(i) both the same alkyl group;

(ii) together form a cycloalkyl group;

(iii) together form a cycloalkenyl group; or

(iv) together form a heterocyclo group;

R^3 is alkyl;

R^4 is aryl;

R^5 is hydrogen, arylcarbonyl, or alkyloxycarbonyl, or a salt thereof.

2. A β-lactam of claim 1 which is crystalline at ambient conditions.

3. A β-lactam of claim 1 which is substantially free of other isomers and in which

the groups $-OC(R^1)(R^2)(OR^3)$ and R^4 are in the cis position relative to each other.

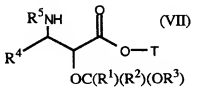
4. A β-lactam of claim 1 where R^1 and R^2 are both the same unsubstituted lower alkyl group, R^3 is unsubstituted lower alkyl, R^4 is phenyl, and R^5 is hydrogen, benzoyl or t-butoxycarbonyl.

5. A β-lactam of claim 3 which is (3R-cis)-3-(1-methoxy-1-methylethoxy)-4-phenyl-2-azetidinone.

6. A β-lactam of claim 3 which is (3R-cis)-1-benzoyl-3-(1-methoxy-1-methylethoxy)-4-phenyl-2-azetidinone.

7. A β-lactam of claim 3 which is (3R-cis)-1-t-butoxycarbonyl-3-(1-methoxy-1-methylethoxy)-4-phenyl-2-azetidinone.

8. A method for the preparation of a sidechain-bearing taxane of the following formula VII or a salt thereof:



where
R^1 and R^2 are:

(i) both the same alkyl group;

(ii) together form a cycloalkyl group;

(iii) together form a cycloalkenyl group; or

(iv) together form a heterocyclo group;

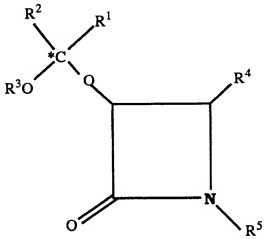
R^3 is alkyl;

R^4 is aryl;

R^5 is hydrogen, arylcarbonyl, or alkyloxycarbonyl; and

T is a taxane moiety bonded directly at C-13 of said moiety;

comprising the step of contacting a β-lactam of the following formula I or a salt thereof:



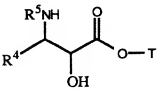
(I)

where R^1, R^2, R^3, R^4 and R^5 are as defined above, with a taxane compound of the following formula VIII or a salt thereof:

HO-T (VIII)

where T is as defined above,
in the presence of a coupling agent; and
optionally, converting the group $-OC(R^1)(R^2)(OR^3)$ of said compound of the formula VII to hydroxyl,

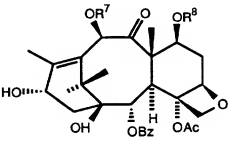
thereby forming a sidechain-bearing taxane or a salt thereof of the following formula IX:



(IX)

where R^4, R^5 and T are as defined above.

9. The method of claim 8, wherein the taxane of the formula VIII is a taxane of the following formula X:



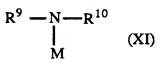
(X)

where
Bz is benzoyl;
Ac is acetyl;
R^7 is hydrogen, alkylcarbonyl, or a hydroxyl protecting group; and
R^8 is hydrogen or a hydroxyl protecting group.

10. The method of claim 9, wherein said taxane of the formula X is a 7-O-trialkylsilyl baccatin III.

11. The method of claim 8, wherein said coupling agent is an alkali metal silylamide base or a sterically hindered alkali metal amide base.

12. The method of claim 11, wherein said coupling agent has the following formula XI:



(XI)

where

R^9 and R^{10} are trialkylsilyl, cycloalkyl, or together with the nitrogen atom to which they are bonded, form a heterocyclo group; and

M is an alkali metal.

13. The method of claim 12, wherein said coupling agent is an alkali metal hexamethyl disilazide.

14. The method of claim 13, wherein said alkali metal hexamethyl disilazide is lithium hexamethyl disilazide.

15. The method of claim 9, further comprising deprotection of one or more hydroxyl groups on the taxane moiety of the sidechain-bearing taxane formed.

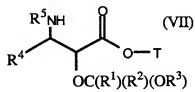
16. The method of claim 15, wherein an acid is employed for said deprotection.

17. The method of claim 10, wherein R^1 and R^2 are both the same unsubstituted lower alkyl group, R^3 is unsubstituted lower alkyl, R^4 is phenyl, and R^5 is benzoyl or t-butoxycarbonyl.

18. The method of claim 17, wherein taxol is prepared.

19. The method of claim 17, wherein taxotere is prepared.

20. A sidechain-bearing taxane of the following formula VII or a salt thereof:



where

R^1 and R^2 are:

(i) both the same alkyl group;

(ii) together form a cycloalkyl group;

(iii) together form a cycloalkenyl group; or

(iv) together form a heterocyclo group;

R^3 is alkyl;

R^4 is aryl;

R^5 is hydrogen, arylcarbonyl, or alkyloxycarbonyl; and

T is a taxane moiety bonded directly at C-13 of said moiety.

21. A compound of claim 20, wherein R^1 and R^2 are both the same unsubstituted lower alkyl group, R^3 is unsubstituted lower alkyl, R^4 is phenyl, and R^5 is benzoyl or t-butoxycarbonyl.

22. A compound of claim 20 which is 2'-MOP-7-triethylsilyl taxol.

23. A method for the preparation of a taxane bearing a sidechain at C-13, comprising the step of contacting a taxane bearing a hydroxyl group bonded at C-13 with a β-lactam capable of forming said sidechain, in the presence of an alkali metal silylamide base or a sterically hindered metal amide base.